

**REMARKS**

Claims 1-17 are pending in the present application. Claims 1-3 and 5-17 stand rejected.

**Preliminary Matters**

The Office Action notes that the title of the invention is not descriptive, and that a new title is required. Applicant requests that the title of the invention be amended to the following: "Method of Manufacturing a Semiconductor Device Utilizing Active Oxygen."

**Applicant's Response to Claim Rejections under 35 U.S.C. § 102**

Claims 1 and 12-16 were rejected under 35 U.S.C. § 102(b) as being anticipated by the **Admitted Prior Art (APA)** in Figures 1a-1c and pages 1-5, paragraphs 3-15 of the specification. Applicant respectfully traverses this rejection.

The **APA** requires exposure to an oxygen atmosphere in order to repair the oxygen deficit in the capacitor. However, claims 1 and 12-16 are distinguishable because they require the supplying of activated oxygen to the capacitor, which results in an improved ferroelectric layer. The effectiveness of using activated oxygen is disclosed in Figure 5, which shows that an amount of polarization charge of a capacitor exposed to activated oxygen is higher than that of a capacitor which is subjected to oxygen annealing in the conventional manner.

Applicant respectfully submits that the Office Action has mischaracterized the **APA** as supplying activated oxygen to the capacitor. Paragraphs #12 and 13 do not provide this teaching as the Office Action asserts. For at least these reasons, the claimed invention patentably distinguishes over the prior art.

Claims 1, 6, and 13-15 were rejected under 35 U.S.C. § 102(b) as being unpatentable over **Koo** (U.S. Patent No. 6,368,909). As with the **APA** discussed in the specification, **Koo** discloses only exposure to an oxygen atmosphere in order to repair the oxygen deficit in the capacitor. Please see column 5, lines 38-46. **Koo** does not disclose the use of activated oxygen as asserted in the Office Action. For at least these reasons, the claimed invention patentably distinguishes over the prior art.

Claims 1, 6, and 12-17 were rejected under 35 U.S.C. § 102(e) as being unpatentable over **Joo et al.** (U.S. Publication No. 20030141527). As with the **APA** discussed in the specification, **Joo et al.** discloses only exposure to an oxygen atmosphere in order to repair the oxygen deficit in the capacitor. Please see paragraphs 88 and 89. **Joo et al.** does not disclose the use of activated oxygen as asserted in the Office Action. For at least these reasons, the claimed invention patentably distinguishes over the prior art.

#### **Applicant's Response to Claim Rejections under 35 U.S.C. § 103**

Claims 2-11 and 17, which are dependent on claims 1 and 12-16, were rejected under 35 U.S.C. § 103(a) as being unpatentable over the **APA** in view of **Isobe et al.** (U.S. Patent No. 6,114,199) and **Koo**. While the **APA** and **Koo** teach forming an opening to expose the top of the capacitor, they do not disclose or suggest the use of activated oxygen.

The Office Action cites **Isobe et al.** for its methods for activating oxygen with UV light. It is asserted that the claimed methods of activating oxygen would have been obvious based on **Isobe et al.** Applicant respectfully traverses this rejection. Since the primary references do not disclose or suggest treatment with activated oxygen, one of ordinary skill in the art would not have been motivated to look to the teachings of **Isobe et al.**

In addition, in **Isobe et al.**, the activated oxygen is introduced after the formation of the lower electrode layer and the ferroelectric layer, but before the formation of the upper electrode layer. Conversely, in claim 1, the activated oxygen is introduced after the capacitor has been etched out of an already formed first conductive layer, oxide dielectric layer, and second conductive layer via a hole in an insulating layer. Thus, **Isobe et al.** teaches away from the claimed invention because it teaches the treatment of active oxygen at a different stage in the manufacturing process. For at least these reasons, the present claimed invention patentably distinguishes over the prior art.

#### **Allowable Subject Matter**

Applicant thanks the Examiner for noting that that claim 4 would be allowable if rewritten as an independent claim. However, it is believed that all claims are in condition for allowance for the reasons discussed above.

For at least the foregoing reasons, the claimed invention distinguishes over the cited art. Favorable reconsideration is earnestly solicited.

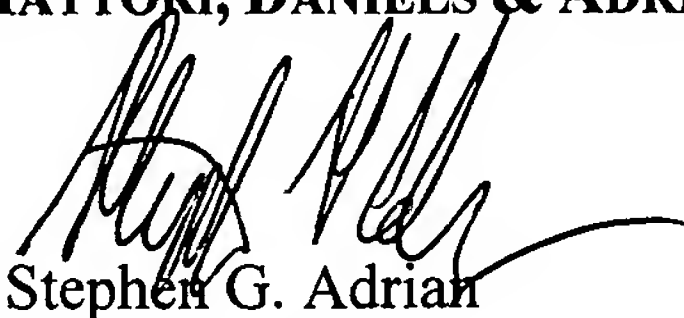
Should the Examiner deem that any further action would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone Applicant's undersigned attorney.

Response under 37 C.F.R. §1.111  
Attorney Docket No. 030983  
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If this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read 'Stephen G. Adrian', is written over the printed name.

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